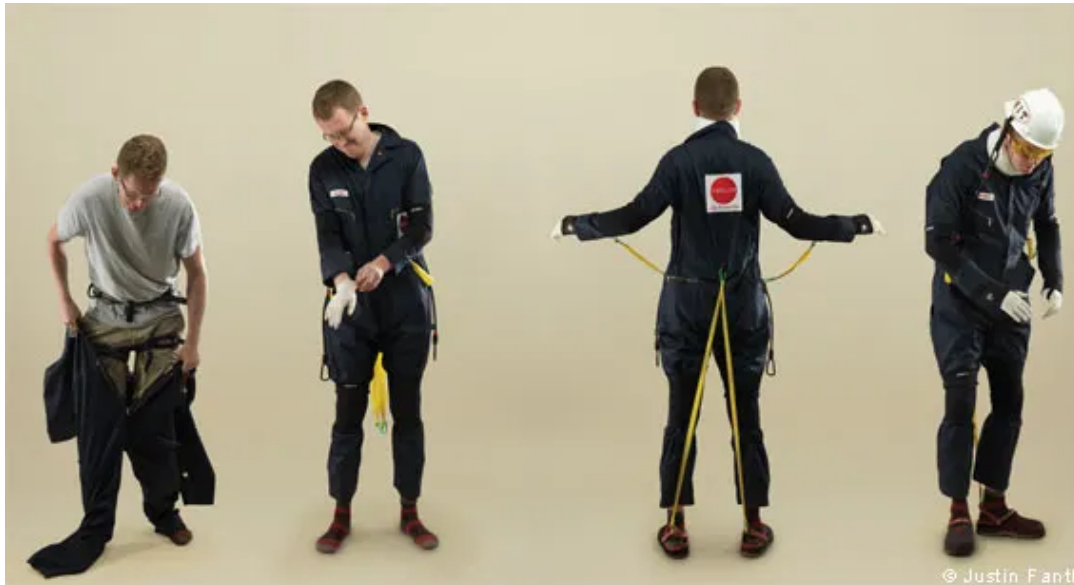


## Agnes the ageing suit

As the world's population gets older, how are we going to manage? Innovative approaches are being developed at the MIT Age Lab



James Crabtree climbs into the Agnes ageing suit, designed to mimic the physical restrictions of old age. A plastic inner harness and elastic bands attached to the feet and hands imitate the movement limitations created by spinal problems, while foam wrist, knee and neck pads simulate the symptoms of arthritis. First constructed in 2005 by a team of MIT researchers with backgrounds in psychology, ergonomics and exercise physiology, the suit has been used by companies as diverse as Siemens, Daimler and General Mills. The latter experimented with it to understand, for instance, the difficulties elderly consumers face when opening cereal boxes

James Crabtree JULY 22 2011

---

## Pensions crisis updates

Sign up to myFT Daily Digest to be the first to know about Pensions crisis news.

Enter your email address

**Sign up**

---

It was only after a couple of hours in the suit that it hit me. I was exhausted. Putting it on hadn't been that hard, although, standing in a windowless classroom in Massachusetts Institute of Technology's [AgeLab](#), I did need help from a researcher to hand over the components. First came the industrial blue overalls. Then the stiff foam knee and elbow restraints, bulked-up versions of those white tubes you wear to recover from a sprained ankle or wrist. Then a series of elastic straps and wires, designed to make it difficult to stretch up, or bend down.



Hard hat with elastic straps to reduce head movement and stretching ability

The hat looked like nothing special – the generic sort worn on building sites – until more straps were attached, dragging my head down and lending a distinctly elderly arch to my back. Then there were the shoes, softened with special spongy soles that made stepping down stairs alarming. I began to walk carefully, fearing a fall. Basic tasks became difficult. Reaching high objects was a struggle, as was a simple chore such as sweeping the floor. The suit's goggles turned my vision yellow, while the double-layered plastic gloves meant the touchscreen on my phone no longer worked.

Yet it was the cumulative effect that took its toll. As I was shown round by Joseph Coughlin, the AgeLab's amiable 50-year-old founder, I felt more and more worn out. The researchers call the outfit Agnes, or Age Gain Now Empathy System, and see it as a carefully designed tool to help businesses adapt their products for elderly consumers. But, after an afternoon inside one, I didn't feel especially empathetic. I felt beat.

I had come to Boston to meet Coughlin on a rainy June morning, to learn about innovative approaches to the problems of an ageing society, and, in particular, to discuss how people could avoid moving into retirement homes in old age. Probably America's most prominent ageing expert, Coughlin is a fixture on the conference circuit, and a doyen of White House advisory committees. His enthusiasm for the subject is infectious: he seems almost to bounce as he talks, his silver and salmon bow-tie bobbing up and down. The garment is something of a trademark: on his office wall, five further examples are mounted and framed in a glass box, a gift from one of the lab's many corporate partners.



Joseph Coughlin, founder of MIT's AgeLab

As we walk, Coughlin points out other age-related gadgets: a set of two-way monitors allowing distant children to check in remotely on elderly parents; a sensor-enabled “smart trash can” to measure how much food is being eaten; and, most charmingly, a furry white robot seal, designed to provide stimulation for a dementia sufferer.

Yet Coughlin balks at the idea that technology alone can solve the many problems thrown up by an ageing population. Instead, he argues that every social and economic institution – from transport and housing to education and commerce – must be reinvented, especially if many millions more are to avoid the indignity and expense of a final trip to a nursing home. “We need a vision that says ageing is not just about the frail. Ageing is about all of us, and how we keep people productive for as long as possible,” Coughlin tells me. “What we’re left with is a crisis, where we’re using yesterday’s social and policy models to address today’s new ageing population. It is a fundamental disconnect.”

The disconnect Coughlin describes isn’t difficult to understand. We are living longer. Much longer. And picking up the tab is going to be expensive.



Paro the seal. Paro is an animatronic 'therapeutic' robot baby seal, designed to comfort elderly patients suffering from dementia. Paro responds to touch and sound, waking up and getting sleepy depending on the frequency with which a user interacts with him. Although born in a lab, Paro is now commercially available, with many thousands of units sold in Japan since it was first put on the market in 2003

The first American baby boomer reached retirement this year. For the next 19 years roughly 10,000 more will retire daily, doubling the population over 65m to 72m, or one in five Americans, by 2030. The same is happening in Britain, where the elderly population has now outgrown the young. And it is the very oldest demographic that is growing most rapidly: the [Office for National Statistics](#) says the number of over-85s will more than double by 2035, to 3.6m. But that's nothing: by then there will have been a seven-fold increase in centenarians too.

This so-called "silver tsunami" stems from a seemingly unstoppable increase in longevity, driven in part by improvements in medical technology. American demographer James Vaupel has shown that human life expectancy in most advanced nations has increased in a linear pattern, rising by about three months a year for the past 170 years. Some experts think this trend will flatten out, but as yet it shows no signs of doing so. A 2010 study in [The Lancet](#) predicted that, assuming it keeps going, half of the babies born since 2000 will live to see their 100th birthday.

As a result, pension systems designed for a decade-and-a-half of retirement now face being stretched over three decades instead. Social care systems are also in crisis, as the scandal over [Britain's bankrupt private care home provider Southern Cross](#) all too readily demonstrated. And the problem is going to get worse: one in 10 of those in their late sixties requires some form of daily personal help, but the number rises to around half of those over 85.



Spongy-soled shoes affect mobility and balance

Yet nursing homes are expensive, with annual costs in the US ranging from \$78,000 for the average nursing home to \$194,000 for full-time home-based care – a bill only a tiny fraction of Americans can hope to afford. The British government's recent [Dilnot review](#) of social care proposed a £35,000 cap on the fees that any individual, or their family, would have to pay. Yet this still leaves a funding gap – likely to grow to around £6bn a year by 2026. And all of this at a time when government budgets across the western world are being cut.

The debate about how to fund long-term care hides another issue. No matter how wisely the current system is reformed, this remains a system no one actually wants to use. Indeed, as a 2005 study from the [American Association of Retired Persons](#) (AARP) points out, around nine in 10 of those shortly to retire express a strong preference to stay in their existing homes during their retirement.

Back in his office, Coughlin is clear that current care models no longer work. “The senior living industry, from independent living on a campus to nursing homes, at the very best is under question, if not under siege,” he says. “Retirement in the future is not going to be about moving to the beach or to the golf course, even if you can afford it. Ageing well is about living in an environment that has the intensity and the density of activities that keep you engaged and healthy.”



A harness sits around the waist and legs

In part to help realise this vision, Coughlin persuaded [MIT](#) to allow him to set up his lab back in 1999. He was frustrated by traditional academic approaches, which treated ageing largely as a medical problem. There were experiments to coax mice or worms into living longer, and money to help cure diseases. But the result was what he calls the longevity paradox: “We spend billions of dollars trying to live longer, but no one puts any thought or any investment into how to live longer, better.”

Tools like Agnes proved especially useful in exploring one sector that Coughlin sees as critical to the future: transport. Here, as in other areas, technology is part of the answer – cars augmented with clever information systems can make drivers more aware of hazards and obstacles, and so on. MIT’s AgeLab even includes a driving simulator housed in a full-size cherry-red Volkswagen Beetle, with sensors to monitor driver eye movements and pulse rates.

Yet the wider issue of driving is one technology can't solve. Seven in 10 Americans live in rural or suburban locations. For many, public transport isn't an option. Most will eventually get too old to drive. Coughlin puts it like this: "Even if I keep you healthy and bring meals to your house, if you don't have transportation you have the same accommodation as a prison." Without new ways to travel, the options many elderly people face are grim. But that isn't the only problem.



Elastic straps to reduce mobility

The tragic consequences of a generation of elderly drivers unwilling or unable to give up their car keys were brought home to Katherine Freund more than 20 years ago. Her three-year-old son Ryan was knocked down by a car driven by an 84-year-old man, in front of their suburban home in Maine. The driver suffered from dementia. Ryan ultimately recovered, but at the time he suffered severe injuries and fell into a coma. "My little boy was run over by an apparently nice old man, who thought he had hit a dog," Freund tells me. "So I began to think about how in the world that happened, and how I [could] make sure that it never happens again to another little boy, and another nice old man."

Having heard about her two-decade-long campaign, I drove up from Boston to visit Freund's office, housed in a converted mill a few miles outside Portland. The city is the largest in Maine, which also happens to be America's most aged state – making it a test-bed for ageing and innovation. Freund is small, carefully dressed, and has a quiet, intense voice. As we talk, sitting around her boardroom table, she pulls out a chunky ball of blue wool and begins to knit.



For a number of years after her son's accident, she tells me, she turned the problem over in her head. Most elderly people have no alternative to cars. Public transport is limited. Taxis are expensive, or unsuitable. There are few rules to stop you driving. Faced with a choice between giving up either their cars or their freedom, most elderly people drive for longer than they should. And, as a consequence, older drivers have the highest accident rates of any group apart from teenagers.



A folded Agnes ageing suit

Freund's solution was [ITNAmerica](#), an innovative not-for-profit organisation that brings together volunteers, vehicles and clever computer software to provide around 50,000 subsidised car rides a year to elderly people across the US. The organisation is, in effect, a cheap, community-run taxi service staffed by a mix of paid and volunteer drivers. Launched in Portland in 1995, it charges an annual \$40 individual membership fee and an average of \$9 a trip, much less than a regular taxi. Partially supported by charitable grants, the service has now expanded to more than 20 cities across America.

The organisation's HQ seems low-tech, right down to the room for a taxi-style dispatcher. But behind the operation lies a clever software package that the organisation had to build from scratch, using complex algorithms to match riders and volunteers. ITN's other bit of ingenuity comes from its use of credits. Volunteer drivers build them up – most are over 60 themselves – and can then cash them in when they choose to stop driving. A volunteer in Los Angeles, meanwhile, could build up credits to donate to an elderly parent on the other side of the country. Freund has also struck deals with local supermarkets, so both ITN and its users get rewarded if they take a trip to the shops.



At ITN's headquarters I meet Sandra [not her real name], a regular user in her late eighties. She has neat white hair and is dressed in a green cagoule. Speaking clearly but slowly, she tells me she suffers from a degenerative joint disease, which made it difficult to turn her head while driving. She had all but given up on her car, relying on ITN instead. Recently, she sold her car to the organisation, too, earning extra ride credits in return: "My insurance was due in April, my automobile registration in June, and a new driver's licence in August. I thought: this is ridiculous!"



Miss Daisy. Housed in a cherry-red Volkswagen Beetle, Miss Daisy is a driving simulator designed to test the effects of cognitive distraction and medication use on older drivers. The car now sits permanently within the AgeLab, having been winched into the building via a modified elevator shaft

Sandra's decision to sell is just one more small victory for Freund. Attitudes are also changing, she says. When she first suggested unsafe elderly drivers ought to be banned she received hate mail, mostly from elderly drivers themselves. Now she thinks more people recognise the problem. ITN still has to find a way to be self-funding, but, having added an affiliate in a new city roughly every year since she began, her ambitions have grown: "We aim to do for transport for older people what Ebay did for flea markets," she tells me.

It is a tall order. ITN will have to grow well beyond its current 50,000 annual rides to meet the demand from the roughly 14m Americans Freund says will need alternative means of transportation by 2030. Still, back at MIT, Joe Coughlin is optimistic: "ITN is easily the most innovative transport project I have seen in 20 years. I think that Katherine is on a footing to do for alternative transportation for the elderly what Ralph Nader did for auto-safety."

...

Just getting around, however, isn't enough to ensure a contented old age. In Boston I meet another woman who began to worry about the wider difficulties around a decade ago. Susan McWhinney-Morse had lived in downtown Boston's elegant Beacon Hill neighbourhood since the mid-1960s. She had counted Senators John Kerry and Ted Kennedy as neighbours, and raised four children. But as retirement loomed, she, along with a group of about a dozen local friends, began to fret about their options.



Residents of Beacon Hill Village

Lively though it was, Beacon Hill was not especially well designed for the elderly. Help from the government was limited to the poor or disabled. Visits to nearby assisted-living facilities and nursing homes convinced her such places were dull, isolating and expensive. "This was a group who weren't going to go out to the 'burbs, to a warehouse, to be warehoused for the rest of their lives. No way," she tells me. "I thought, this is where I come from ...I'm simply not going to go."

Two years later, in February 2002, she launched [Beacon Hill Village](#), a charity designed to support the elderly population in the area. Like ITNAmerica, help with transport was a big part of the plan. But the group added discounts at local stores and medical facilities, and a programme of social activities, ranging from political discussion groups to trips out of town. A range of volunteers and paid professionals were available too, to help with everything from odd jobs to more formal care services.

More unusually, the organisation provided a concierge-style phone line, which members could call for advice on pretty much anything they wanted, whether it was a medical issue or finding a local handyman. Some used the service for more unusual purposes: one inherited an antique lamp shade and rang up asking how to get it repaired; another wanted a trip to a local horse race track to pick up her winnings.



Smart trash can. Part of the AgeLab's 'E-Home project' to redesign living arrangements for older people, the smart trash can uses radio frequency identification (RFID) antennas to tag objects in a kitchen. This allows the bin to sense when items have been used or thrown out – letting distant family members or caregivers look out for unusual eating behaviours

The idea caught on: around 400 local residents have now signed up, each paying \$640 for individual annual membership. The concept attracted wider attention too, especially after an article about the organisation appeared in a magazine sent out to 30 million members of the AARP. A range of imitators began to spring up, and now similar villages exist in 64 communities across the US.

Sitting around a table at the organisation's Beacon Hill office, McWhinney-Morse explains her vision for this "village movement" in grand, historical terms. "We were the generation that, after the second world war, got into our cars and drove to college and never came back," she says. "I can remember going to a department store with my grandmother, and before we got back home the goods were delivered. That world died with the war. And what that world did was help to support older people in their own homes." It is these networks of support that must now be rebuilt.

Implicit in the movement is a further rejection of the idea of moving away from home to retire. McWhinney-Morse mentions Del Webb, the American developer who built Sun City, the famous retirement community in Arizona. “His model was: come to retire, come to Arizona, come play golf. But don’t die here, because we have no facilities.” However, she also admits to doubts about how replicable the Beacon Hill model can become. It was never designed, she tells me, entirely to replace a nursing home or long-term professional care.

But back up in Maine, I met one couple who claim to have found just that answer – a new, inexpensive means of caring for elderly people who otherwise would need to go into a home.

...

Jim Maxmin and Shoshana Zuboff make unlikely saviours for the social care industry. An American, Maxmin spent much of his life as a businessman in Britain. He became chief executive of Volvo UK at the age of 34, and went on to lead both Thorn Home Electronics and later Laura Ashley – often shuttling back and forth across the Atlantic on weekends. Zuboff, a noted thinker on the impact of new technologies in the workplace, was one of the first women to join the faculty at Harvard Business School and was awarded tenure and an endowed Chair at an early age.



Jim Maxmin and Shoshana Zuboff are the founders of Elder Power



Maxmin and Zubboff's genuinely is a marriage of ideas, given they are best known for co-authoring [\*The Support Economy\*](#), a popular management book published in 2004. In it they argue that the frustrations consumers feel, especially when they are put on hold on the telephone, or otherwise badly treated, can only be overcome through an entirely new model of "distributed capitalism" with new systems of "deep support" for customers at its heart.

These ideas provide the background for the duo's thinking on ageing, but the spark came from unusual coincidences beginning with their decision to move to the country. Keen to raise a family, they bought a disused dairy farm in the picturesque seaside town of Damariscotta, about three hours' drive north of Boston in rural Maine. Their first son was born, and they began to get involved in the local community, giving presentations about their work.

They also met a local doctor, Alan Teel, who had started a business using webcams to monitor elderly patients who wanted to remain in their homes. After years of struggle he was unable to cover his costs. Around the same time a budget crisis saw the state of Maine cut the support it provided to Damariscotta's private residential care home, threatening it with bankruptcy.

Both got Maxmin thinking. His experience at Thorn Home Electronics, which included Radio Rentals, taught him that if you can accelerate the depreciation of a piece of technology, such as a webcam, you can then give it away to a person who would otherwise not be able to afford it. Overheads could be lowered further if local people could be persuaded to volunteer as receptionists or bookkeepers, or simply to check in on elderly people at home. The care home's building could also be an asset: its rooms could host other medical services, while its kitchen could be used to cook food for non-residents.

Maxmin spent long evenings poring over spreadsheets, puzzling over how to make the numbers add up. Eventually he hit upon a combination that seemed to work, and [\*Elder Power\*](#), as the new organisation came to be called, was launched in 2008. It offers different packages of care, ranging from \$100 to \$600 a month, for which customers receive a mixture of visits and daily phone calls, along with cameras and motion sensors to monitor their wellbeing. More personal support – including transportation, help with meals and bathing – is provided too, although some of it costs extra.

Publicity came gradually, first by word of mouth then through presentations at local churches and community groups. A handful of elderly people joined, then a few dozen more, with the group eventually growing to more than 100. Much like Beacon Hill Village, the project aimed to use local facilities. But unlike Beacon Hill, Maxmin and Zuboff's business takes all comers, often providing intensive support to those with severe conditions, including Alzheimer's.



The prototype AwareCar, a souped-up dark red Lincoln MKS, uses on-board eye-tracking cameras to measure the effects of fatigue and distraction on driving ability, while sensors measure heart and breathing rates. The car has helped researchers understand what type of information helps to focus, or distract, elderly drivers on the road

More importantly, Maxmin says, his model worked, providing almost all of the services associated with a nursing home, at a tiny fraction of the cost. Zuboff wrote up the experience as a case study in a recent issue of the management journal McKinsey Quarterly. Her figures showed that while the average monthly cost for nursing-home care in Maine remains at around \$7,000 – rising to \$24,000 for 24-hour home care – Elder Power allowed its members to stay in their homes for an average cost of \$702 a month.

Maxmin admits there are no miraculous solutions to the problems of a fast-ageing society. We will all have to work longer, save more and pay more in tax to cover the costs of a world with a greyer population. Even so, he thinks models like Elder Power can have a much wider application. Perhaps moments like the collapse of Southern Cross, he tells me, could (in the right hands) become moments of opportunity. More generally, models like Beacon Hill Village, ITNAmerica and Elder Power show glimpses of a future in which more elderly people can stay in their homes for longer. All three use innovative technology, make use of assets in their local community and bring together the resources of local businesses, volunteers and the state to solve problems none could have solved individually, at reasonable cost.

Back at MIT, Joe Coughlin also refuses to be downbeat. “I would argue that longevity is probably the greatest achievement of human kind that has gone ignored. If you talked to anyone and said, ‘congratulations, you’re going live 30 to 40 years longer than your grandparents did in the 1900s’, that would be seen as a bonus prize.” With a bit of ingenuity, it’s a prize worth taking.

*James Crabtree is the FT’s comment editor*

[magazineletters@ft.com](mailto:magazineletters@ft.com)

.....



**The world’s most innovative ageing projects**

**Mensheds Australia**



This charity targets those at risk of loneliness or isolation by building or renovating a local shed in which men of all ages can come together and work. It also provides advice on health and emotional support during periods of stress. The approach has been trialled by the charity Age UK, where the scheme is called Men in Sheds.

### **Fureai Kippu, Japan**

Translated as “elderly care units” or, more charmingly, “kindness tickets”, Fureai Kippu is a nationwide Japanese system of local alternative currencies to help care for elderly people. One currency unit represents an hour of service. Volunteers in one part of the country can visit an elderly person and then use the credits gained to have a volunteer look in on their own parents or relatives back at home.

### **Senior Co-Housing, Netherlands**

Sometimes known as “lifetime neighbourhoods”, senior co-housing is a system of mixed-age residential developments designed to allow young and old to live together and support each other. First developed in Denmark in the 1960s, the Dutch system now has many hundreds of groups of elderly people living in such communities.

### **Circles, UK**

An innovative programme of social services for elderly people, which operates by creating local “circles” of support using a mix of concierge-style phone and internet help services and local volunteer “neighbourhood helpers” to augment traditional social care. Begun as a pilot in the London borough of Southwark, the concept is now being rolled out across the UK.

### **The Good Gym, UK**

The Good Gym pairs joggers with isolated elderly people, asking the runners to pop in for a chat during their daily exercise. Magic Me, another organisation seeking to bring fun and the chance to take part in artistic activities to older people, invites volunteers to host cocktail parties in residential homes.

### **Aconchego, Portugal**

Started in Porto, the Aconchego programme finds elderly people at risk of loneliness and isolation but with a spare room to offer, and matches them with local university students in need of inexpensive housing. The project now operates in Lisbon and Coimbra, while a similar programme, called Ensemble2Generations, is up and running in Paris.

## **Tyze, Canada**

A private, Facebook-style online social network, Tyze allows elderly people to share private information with their family, friends, care-givers and health providers. This “personal network” of support helps to bridge formal and informal systems of assistance.

## **Norcs, US**

Norcs, or “naturally occurring retirement communities”, are buildings or neighbourhoods that have been retro-fitted to provide services for elderly people. Often located in a single residential estate or tower block, a Norc will provide traditional health and social care services (such as a live-in nurse or doctor) along with help with transport, education and recreation.

## **Experience Corps, US**

Established in the mid-1990s, Experience Corps has grown to become America’s largest non-profit national service organisation, providing tutoring opportunities to more than 2,000 over-55s in 20 US cities. Research suggests that the programme helps its students boost their reading comprehension, while also improving the cognitive function of the elderly tutors themselves.